

Annual Report

Precipitation Analyses in Support of GAPP Modeling Initiatives

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PROJECT DURATION

October 2001 - September 2004

ANNUAL REPORT PERIOD

October 2002-September 2003

NAME OF PRINCIPAL INVESTIGATOR

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INSTITUTION

Climate Prediction Center, NCEP/NWS/NOAA

INTRODUCTION

The work summarized below has been conducted over the past year (October 2002-September 2003) to produce accurate and complete estimates of precipitation over the United States and Mexico. A primary goal has been to create a set of improved precipitation analyses for model assimilation and forcing that suits the needs of several active communities within GAPP, including Regional Reanalysis and LDAS. To achieve that goal we are:

1. Testing and implementing improved techniques for high resolution daily precipitation analyses over the United States and Mexico;
2. Producing high resolution real time daily precipitation analysis products in support of Land Data Assimilation System for the United States and Mexico;
3. Preparing a daily retrospective analysis for a multi-year (1948-present) period for the United States and Mexico in support of the NCEP Regional Reanalysis and the NCEP Soil Moisture Reanalysis projects.

Overall project goals and methodology are discussed in the original proposal and in various publications listed below.

PROPOSED WORK AND ACCOMPLISHMENTS (October 2002-September 2003)

(1) Continue routine runs of real time precipitation analyses for the U.S. and Mexico in support of GAPP projects:

- Produced realtime US and Mexican daily precipitation analyses in support of LDAS and Regional Reanalysis with $1/8^\circ$ horizontal resolution, inverse-distance scheme and PRISM climatology.

(2) Complete precipitation reanalysis over Mexico on Regional Reanalysis grid with appropriate analysis technique:

- Processed missing Mexican gauge data and produced gridded analysis for the period May 1999-present;
- Completed U.S.-Mexico merged analysis for the period 1948-present.

(3) Continue updates of Unified Raingauge Database (URD) and precipitation reanalyses over the U.S.:

- Incorporated SNOTEL and HADS datasets into the Unified Raingauge Database (URD);
- Added HPD and NCDC daily for 2002 to URD for Regional Reanalysis;
- Extended Hourly Precipitation Data (HPD) to include the period 1948 - 2002 (September);
- Extended Reanalysis Version 1: URD gridded at $1/4^\circ$ resolution with modified Cressman scheme (1948-1998)
- Extended Reanalysis Version 2: URD gridded at $1/8^\circ$ resolution with inverse-distance scheme and PRISM on LDAS domain for 1948-1998. Similar analyses based on RFC data were produced for 1999-2002 and provided to Regional Reanalyses and N-LDAS, in order to allow these projects to run through the year 2002. We will reanalyze the latter period using the URD once it is complete.

(4) Continue collaborative work with other projects and implement new precipitation products as required, including on the CPC Web Site (<http://www.cpc.ncep.noaa.gov>);

- Analyzed historical Canadian gauge data at a horizontal resolution of 1° for the period 1963-2002 using the modified Cressman scheme for Regional Reanalysis Project.
- Produced historical daily precipitation analysis for Brazil (1960-1997) at 1° resolution with modified Cressman scheme.

(5) Document research through presentations and papers.

Journal Articles (peer-reviewed):

Koster, R. D., M. J. Suarez, R. W. Higgins, and H. M. Van den Dool, 2003: Observational evidence that soil moisture variations affect precipitation. *Geophys. Res. Lett*, **30**, 1241-1244

Larson, J, Y. Zhou and R. W. Higgins, 2003: Characteristics of Landfalling Tropical Cyclones in the United States: Climatology and Interannual Variability, *J. Climate* (submitted)

Atlases and Technical Reports:

Gutzler, D., H.-K. Kim and R. W. Higgins, 2003: The North American Monsoon Assessment Project. Climate Prediction Center Technical Note 11.

Higgins, R. W. and D. Gutzler, 2001: Warm Season Precipitation. Chapter 4 of the GEWEX Americas Prediction Project (GAPP) Science and Implementation Plan.

Conference Presentations:

Higgins, R. W., 2003: Overview of the North American Monsoon Experiment (NAME). AMS Symposium on Observing and Understanding the Variability of Water in Weather and Climate, 83rd AMS Annual Meeting, Long Beach, CA,, (Feb 2003) (9 pages).

Shi, W., R. W. Higgins, E. Yarosh and R. Joyce, 2003: Processing Daily Rain-Gauge Precipitation Data For the Americas at the NOAA Climate Prediction Center. 19th International Conference on Interactive Information Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology. Long Beach, CA, 9-13 Feb., 2003

Shi, W., R. W. Higgins, E. Yarosh, 2003: Precipitation Analyses in Support of GAPP Modeling Initiatives. GAPP Pis Annual Meeting. Seattle, WA, 21-24 July, 2003

Yarosh, E., W. Higgins, and W. Shi, 2003. High-resolution daily precipitation analyses over U.S. at the CPC/NCEP. Workshop on Objective Analysis of Precipitation, Reading UK, March 11-13, 2003.

Meetings Attended:

27th CDPW, GMU, Fairfax, VA (Oct 02)
NAME SWG-3, GMU, Fairfax, VA (Oct 02)
CPAW Workshop, Alexandria, VA (Oct 02)
NAME SWG-4, Boulder, CO (Jan 03)
83rd AMS Annual Meeting, Long Beach, CA, (Feb 03)
Pacific Decadal Variability, Alexandria, VA, (Feb 03)
NSF Tier 1 Network, Arlington, VA (Mar 03)
6th VAMOS Panel Meeting, Miami, FL, (Apr. 03)
NASA Subseasonal Workshop, UMD, (Jun 03)
NAME Modeling and Data Assimilation Workshop, Greenbelt, MD, (Jun 03)
GAPP PI Meeting, Seattle, WA (Jul 03)
CLIVAR Pan Am Panel Meeting, Seattle, WA (Aug. 03)
NWS Climate Services Focal Point Workshop, Reno, NV (Sep. 03)
CLIVAR Pan American PI Meeting, Boulder, CO (Sep. 03)

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